

MASWSS0060

**Features**

- Balanced (symmetrical) RF Ports
- Low Cross Modulation
- Low Insertion Loss: 0.55 dB at 1 GHz
- High Isolation: 21 dB at 2 GHz
- Miniature Package: FQFP 12-lead 3x3mm
- 0.5 micron GaAs PHEMT Process

**Description**

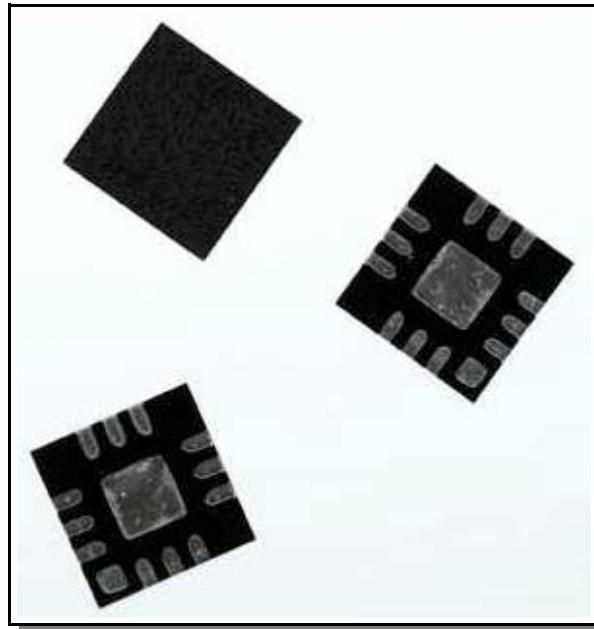
M/A-COM's MASWSS0060 is an industry leading GaAs PHEMT MMIC single pole three throw (SP3T) CDMA-GPS switch in a low cost FQFP 12-lead 3x3mm package. The MASWSS0060 is uniquely configured to enable switching from a common antenna port to CDMA cellular, CDMA PCS, or GPS ports. The design is symmetric and has been fully optimized for excellent cross modulation performance in all three paths while still maintaining excellent insertion loss and isolation. Note that since the design is symmetric, the user can assign CDMA cellular, CDMA PCS and GPS to ports RF1, RF2 or RF 3 at his or her discretion.

The MASWSS0060 is fabricated using a 0.5 micron gate length GaAs PHEMT process. The process features full passivation for performance and reliability.

**Electrical Specifications:  $T_A = 25^\circ\text{C}$ ,  $Z_0 = 50 \text{ Ohms}^1$** 

Parameter	Test Conditions	Frequency	Units	Min.	Typ.	Max.
Insertion Loss <sup>2</sup>	All Paths	1.0 GHz 1.5 GHz 2.0 GHz	dB dB dB	— — —	0.55 0.60 0.70	0.70 0.75 0.90
Isolation		DC - 1.0 GHz 1.0 - 2.0 GHz 2.0 - 2.5 GHz	dB dB dB	23 18 16	27 21 20	— — —
Return Loss	All RF ports	DC - 2.5 GHz	dB	—	20	—
IP3	Two Tone +22 dBm, 1 MHz Spacing Two Tone +22 dBm, 1 MHz Spacing	820 MHz 1880 MHz	dBm dBm	— —	62 61	— —
Cross Modulation	CDMA TX +25 dBm @ 820.5 MHz, RX <sub>INT</sub> -27 dBm @ 865 MHz, V <sub>c</sub> = 0V/2.7V		dBm	—	-101	—
	CDMA TX +20 dBm @ 1950.5 MHz, RX <sub>INT</sub> -27 dBm @ 1870 MHz, V <sub>c</sub> = 0V/2.7V		dBm	—	-102	—
P.1dB	V <sub>c</sub> = 0V/2.7V	1 GHz	dBm	—	36	—
Trise, Tfall	10% to 90% RF, 90% to 10% RF	900 MHz	μS	—	0.06	—
Ton, Toff	50% control to 90% RF, and 50% control to 10% RF	900 MHz	μS	—	0.09	—
Transients	In Band		mV	—	70	—
Gate Leakage	V <sub>c</sub> = 0V/2.7V		μA	—	—	30

1. External DC blocking capacitors are required on all RF ports.
2. Insertion Loss can be optimized by varying the DC blocking capacitor value, e.g. 1000 pF for 100 MHz - 500 MHz, 100pF for 0.5 GHz - 2.5 GHz.

**FQFP 12-lead 3x3 mm**

## Pin Configuration

Pin No.	Function	Description
1	V1	Control 1
2	RF1	RF Port 1
3	GND	Ground
4	GND	Ground
5	RF2	RF Port 2
6	V2	Control 2
7	GND	RF Ground
8	RF3	RF Port 3
9	V3	Control 3
10	GND	RF Ground
11	ANT	Antenna Port
12	GND	RF Ground
13	GND (paddle)	RF Ground

## Qualification

Qualified to M/A-COM specification REL-201, Process Flow -2.

## Handling Procedures

The following precautions should be observed to avoid damage:

### Static Sensitivity

Gallium Arsenide Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

## Absolute Maximum Ratings <sup>3</sup>

Parameter	Absolute Maximum
Max Input Power (0.5 - 2.5 GHz, 2.7V Control)	+36 dBm
Control Voltage	±8.5 volts
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +150°C

3. Exceeding any one or combination of these limits may cause permanent damage to this device.

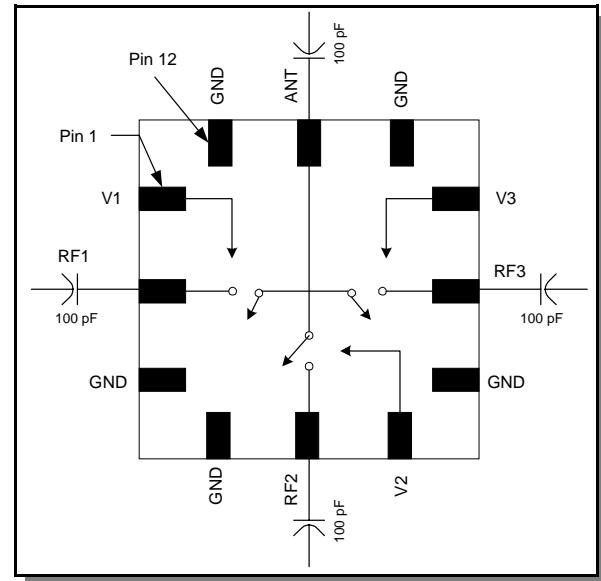
## Truth Table <sup>4,5</sup>

V1	V2	V3	ANT-RF1	ANT - RF2	ANT - RF3
1	0	0	On	Off	Off
0	1	0	Off	On	Off
0	0	1	Off	Off	On

4. Differential voltage, V (state 1) - V (state 0) must be 2.6V minimum.

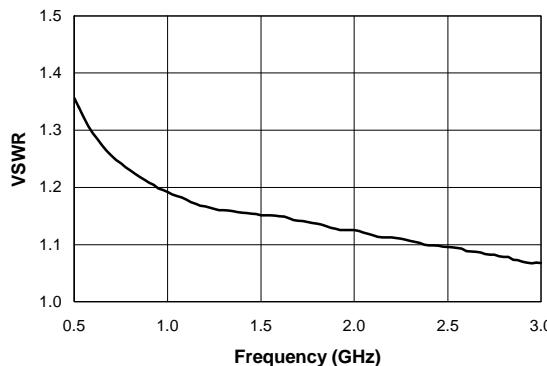
5. 0 = -5V to 2.4V, 1 = -2.4V to 5V.

## Functional Schematic

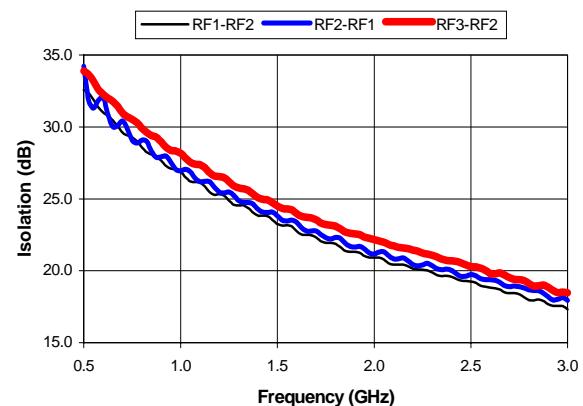


## Typical Performance Curves

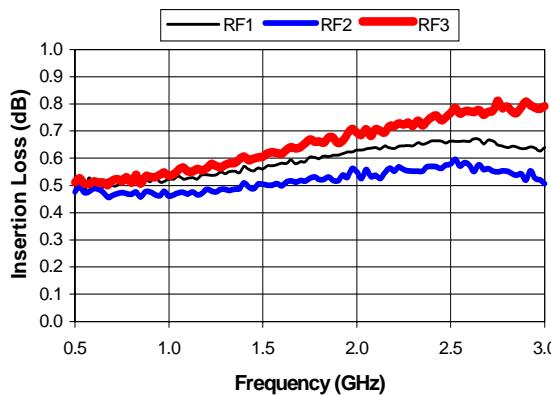
**VSWR @ +25°C**



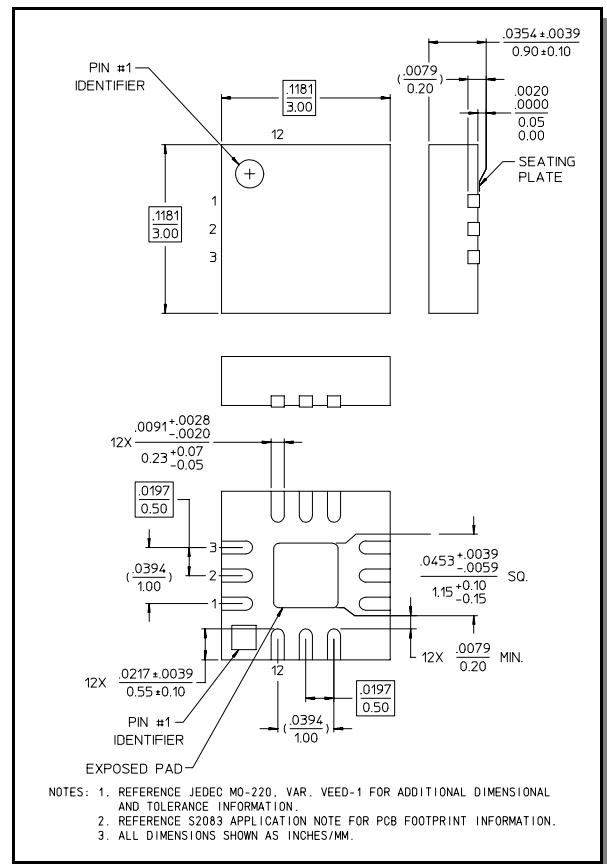
**Isolation @ +25°C**



**Insertion Loss @ +25°C**



**FQFP 12-lead 3x3 mm**



## Ordering Information

Part Number	Package
MASWSS0060	Bulk Packaging
MASWSS0060TR	1000 piece reel
MASWSS0060TR-3000	3000 piece reel
MASWSS0060SMB	Sample on Evaluation Board

Note: Reference Application Note M513 for reel size information.

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